

Incomplete

MAR
APR
MAY

MISSING

ENDANGERED SPECIES

Technical Bulletin

U.S. Department of the Interior
Fish and Wildlife Service

Positive Effects of Hurricane Hugo: Record Years for Puerto Rican Parrots Nesting in the Wild

by J. Michael Meyers, Francisco J. Vilella, and Wylie C. Barrow, Jr.

*Editor's note: When Hurricane Hugo struck in 1989, it had serious impacts on some species of wildlife as well as on people. Red-cockaded woodpeckers (*Picoides borealis*) in South Carolina, for example, were hit particularly hard. (See Bulletin Vol. XIV, No. 9-10.) But the following account shows that, for at least one species, the storm may have had a silver lining:*

In September 1989, Hurricane Hugo passed over the Luquillo Mountains of Puerto Rico. The rain forest in these mountains is the last refuge of the critically endangered Puerto Rican parrot (*Amazona vittata*). As expected, fewer parrots were counted in this part of the Caribbean National Forest in 1990, but over the next 2 years the wild flock produced a record number of young. Environmental changes caused by Hurricane Hugo may have played a part in these increases.

Since the arrival of Europeans in the Caribbean 500 years ago, many of the unique wildlife species of these islands have declined or become extinct. The Puerto Rican parrot was once abundant and widespread, but by the early 1970's deforestation, hunting, and nest robbing had reduced its population to 13 individuals. Fortunately, a cooperative effort of the U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (FS), and Puerto Rico Department of Natural Resources has prevented the extinction of this bird, the only endemic parrot species remaining in Puerto Rico and the Virgin Islands. From 1971 to 1989, the number of Puerto Rican parrots grew from fewer than 20 to more than 88.



Puerto Rican parrots

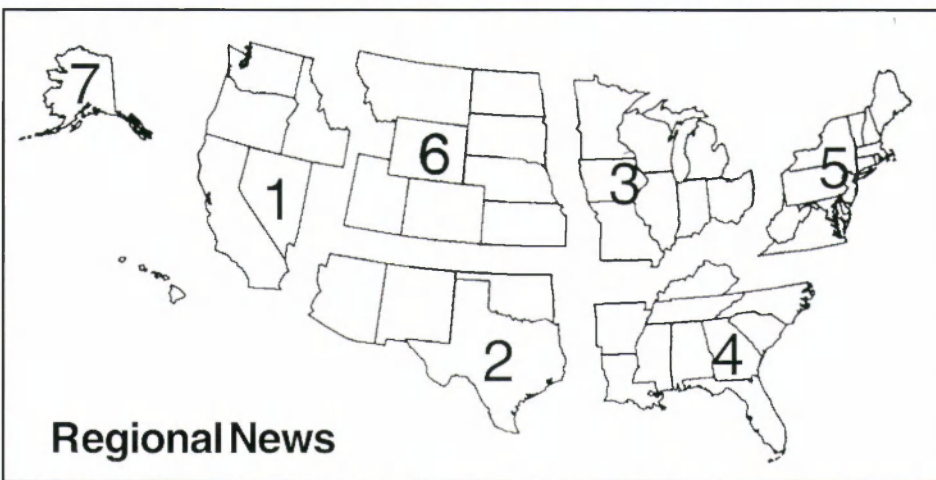
Post-hurricane Population Increases

In August 1989, one month before Hurricane Hugo, 47 Puerto Rican parrots were counted in the wild. Three months after the storm, only 20-22 parrots were seen, and only 3 breeding pairs were known to have survived. Traditional foraging areas may have been devoid of food after the hurricane, which

struck before the parrot's winter breeding season. In 1990, breeding activity was low; three pairs nested, but only one pair successfully fledged young.

In both 1991 and 1992, however, the wild flock of Puerto Rican parrots produced a record six successful nests each year, the highest number since the 1950's¹. In 1991, 6 pairs nested in the

(continued on page 10)



Regional News

Regional endangered species staffers have provided the following news:

Region 2 - Four of the young whooping cranes (*Grus americana*) re-

leased in February in central Florida as members of the first attempted nonmigratory flock have been killed by bobcats (*Felis rufus*), confirming biolo-

U.S. Fish and Wildlife Service Washington, D.C. 20240

John Turner, Director
(202-208-4717)

Michael J. Spear,
Assistant Director for
Ecological Services
(202-208-4646)

Paul Gertler, Acting Chief,
Division of Endangered Species
(703-358-2171)

Marshall P. Jones, Chief
Office of Management Authority
(703-358-2093)

John J. Doggett, Chief,
Division of Law Enforcement
(703-358-1949)

TECHNICAL BULLETIN
Editor, Michael Bender
Assistant Editor, Ann Haas
Additional Editorial, Dianne Taylor
(703-358-2166)

Regional Offices

Region 1, Eastside Federal Complex, 911 N.S. 11th Avenue, Portland, OR 97232-4181 (503-231-6118); Marvin Plenert, *Regional Director*; Dale Hall, *Assistant Regional Director*; Cindy Barry and Jim Bartel, *Endangered Species Specialists*.

Region 2, P.O. Box 1306, Albuquerque, NM 87103 (505-766-2321); John G. Rogers, *Regional Director*; James A. Young, *Assistant Regional Director*; Jamie Rappaport Clark, *Endangered Species Specialist*.

Region 3, Federal Bldg., Fort Snelling, Twin Cities, MN 55111 (612-725-3500); Sam Marler, *Regional Director*; John Blankenship, *Assistant Regional Director*; Craig Johnson, *Endangered Species Specialist*.

Region 4, Richard B. Russell Federal Bldg., 75 Spring Street, S.W., Atlanta, GA 30303 (404-331-3580); James W. Pulliam, *Regional Director*; Tom Olds, *Assistant Regional Director*; David Flemming, *Endangered Species Specialist*.

Region 5, One Gateway Center, Suite 700, Newton Corner, MA 02158 (617-965-5100); Ronald E. Lambertson, *Regional Director*; Ralph Pisapia, *Assistant Regional Director*; Paul Nickerson, *Endangered Species Specialist*.

Region 6, P.O. Box 25486, Denver Federal Center, Denver, CO 80225 (303-236-7920); Ralph O. Morgenweck, *Regional Director*; Robert E. Jacobsen, *Assistant Regional Director*; Larry Shanks, *Endangered Species Specialist*.

Region 7, 1011 E. Tudor Rd., Anchorage, AK 99503 (907-786-3542); Walter O. Stieglitz, *Regional Director*; Rowan Gould, *Assistant Regional Director*; Ron Garrett, *Endangered Species Specialist*.

Region 8, (FWS Research and Development nationwide), Washington, D.C. 20240; John D. Buffington, *Regional Director*; Al Sherk, *Endangered Species Specialist* (703-358-1710).

U.S. Fish and Wildlife Service Regions

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and the Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the U.S. Virgin Islands. **Region 5**: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska. **Region 8**: Research and Development nationwide. **Region 9**: Washington, D.C. Office.



Published on recycled and recyclable paper. If you do not keep back issues, please recycle the paper, pass them along to an interested person, or donate them to a local school or library.

gists' concerns that the inexperience of the captive-bred birds with wild predators would contribute to early losses.

"We anticipated the threat of bobcats and removed several of the animals from the site before the whooping cranes were released. We also removed bobcats after the birds were on their own," commented Dr. Jim Lewis, Fish and Wildlife Service (FWS) National Whooping Crane Coordinator. "We had conditioned the cranes raised at the International Crane Foundation to flee from predators using humans and dogs," he added. "Next time, we may create a robot bobcat or enlist a real tomcat—declawed and defanged, of course—to develop the wariness essential for self-preservation. Releasing these birds into the wild is a bit like taking teenagers who have only known a protected atmosphere and turning them loose in the center of a crime-ridden city, with the expectation that they'll prosper. However, the longer the cranes survive in their new environment, the better their chances will be for successful acclimation."

For several weeks, the whooping cranes ate commercial feed along with natural prey—crayfish, aquatic insects, snails, and freshwater shrimp—stocked in two small ponds in the 3/4-acre (0.3 hectare) pen where they were quarantined. The release of the first six cranes into their temporary enclosure attracted national television and newspaper reporters to a press conference in Kissimmee Prairie on January 7. The birds had been shipped the day before from the International Crane Foundation (ICF) in Baraboo, Wisconsin.

At the press conference, FWS Director John Turner, Assistant Executive Director of the Florida Game and Fresh Water Fish Commission Al Egbert, Whooping Crane Coordinator Jim Lewis, and Florida biologist Steve Nesbitt spoke about partnership efforts to restore this Endangered species to its historic range. Using telephoto lenses, the media filmed and photographed the cranes from a blind outside their enclosure.

(continued on page 11)

Eastern Timber Wolf Recovery Progresses in the Lake Superior Region

by L. David Mech

A milestone on the way to recovery of the eastern timber wolf (*Canis lupus lycaon*) in the United States was reached in 1991 with the first documented reproduction of wolves in mainland Michigan since 1956. A newly-formed mated pair produced a minimum of six pups in the central Upper Peninsula, according to James Hammill of the Michigan Department of Natural Resources. At least five of the pups survived into the winter of 1991, and three more in 1992. At least 20 wolves are now known to inhabit northern Michigan; some of their ranges straddle the border with Wisconsin.

Wisconsin's wolf population also has had another banner year, reaching its highest level since wolves began recolonizing the State in about 1975. Adrian Wydeven of the Wisconsin Department of Natural Resources estimates that 40 to 50 wolves in 14 packs now inhabit Wisconsin. These increases represent one of

the great successes of the Endangered Species Act, which protects wolves in the 48 conterminous States.

Neighboring Minnesota's wolf population has also increased. The population of 600-700 wolves in the early 1970's has grown to 1,550 to 1,750, according to the Minnesota Department of Natural Resources. This buildup promoted the dispersal of wolves from Minnesota to Wisconsin, which began the long, slow recolonization process. However, a stretch of highly developed area south of Duluth and Lake Superior, including a four-lane interstate highway, effectively separates all but one or two Minnesota packs from Wisconsin and allows only the most determined dispersers to reach Wisconsin.

A goal of the Eastern Timber Wolf Recovery Plan is a combined Wisconsin/Michigan population (outside of Isle Royale, Michigan) of 100 wolves during

winter for at least 5 consecutive years. The population is well on its way to reaching that goal.

From about 1975 to 1985, the wolf population in Wisconsin and Michigan seemed unable to gather enough momentum to increase. Although incidental, accidental, and deliberate illegal taking of wolves accounted for some of the lack of population growth, new diseases such as canine parvovirus, Lyme disease, and heartworm probably contributed. Although these problems continue to plague the wolf in the Lake Superior region, and may yet slow or prevent recovery, there is considerable reason for optimism as the wolf population appears to be increasing.

Dr. Mech is a wolf specialist with the U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center (mailing address: North Central Forest Experiment Station, 1992 Folwell Avenue, St. Paul, Minnesota 55108).

Forensics Lab Identifies Animals Killed in Wyoming and North Dakota as Wolves

Two large canids killed in Wyoming and North Dakota in late 1992 have been identified by the Fish and Wildlife Service's (FWS) National Forensics Laboratory in Ashland, Oregon, as gray wolves (*Canis lupus*), which are listed in all 48 conterminous States under the Endangered Species Act.

One of the wolves was shot and killed last September (see *Bulletin* Vol. XVII, No. 9-11) in Bridger-Teton National Forest, just south of Yellowstone National Park, by a hunter who said he thought it was a coyote (*Canis latrans*). After closer examination, the hunter notified authorities because of the animal's size and resemblance to a wolf. Up to that time, wolves were not confirmed to occur in Wyoming since they were exterminated from the State earlier this century. Au-

thorities declined in this case to prosecute the man for violating the Act. However, the incident puts hunters on notice that wolves may be present in the Yellowstone area and emphasizes the importance of positively identifying one's target when hunting.

The animal was sent to the National Forensics Laboratory for genetic analyses to confirm its identity. Scientists at the lab compared DNA from the animal to DNA from 11 wolves from Montana, 11 from Alaska, 9 from Minnesota, and individual samples of Mexican wolf (*Canis lupus baileyi*), coyote, and domestic dog (including elkhound, German shepherd, Labrador retriever, Rottweiler, collie, and husky/wolf hybrid). Two different analyses — nuclear DNA and mitochondrial DNA — were used. According to lab

reports, mitochondrial DNA of the animal killed in Wyoming was similar to four gray wolf reference standards and identical to the lineage found in gray wolves in western Montana.

"It is not unusual for lone wolves to disperse from a pack and travel hundreds of miles in search of a mate or another pack, or to establish a new territory," said Ralph Morgenweck, FWS Denver Regional Director. "Identification of this animal as a wolf does not affect the Environmental Impact Statement presently being drafted on reintroduction of wolves into Yellowstone National Park."

The other animal identified as a gray wolf by the National Forensics Laboratory was shot in November near Watford City, North Dakota. "The black color

(continued on page 15)

Listing Proposals — December 1992

Forty-one species — 38 plants and 3 fishes — were proposed by the Fish and Wildlife Service (FWS) during December 1992 for listing as Endangered or Threatened. If the listing actions are approved, Endangered Species Act protection will apply to the following:

26 Hawaiian Plants

A total of 26 plants endemic to the Hawaiian Islands were recommended in 3 separate proposals for listing as Endangered. The first notice, published in the December 17 *Federal Register*, called for listing the following 22 taxa, which are found primarily on the island of Hawai'i, or the "Big Island." The Hawaiian names for these plants (when available) are given first:

- 'oha wai (*Clermontia lindseyana*) - a shrub or tree in the bellflower family (Campanulaceae) with greenish white or purplish, tubular flowers
- 'oha wai (*Clermontia peleana*) - a related shrub or tree with blackish-purple or greenish-white flowers that grows epiphytically (not rooted in soil); named after the Hawaiian volcano goddess Pele

- 'oha wai (*Clermontia pyralaria*) - a tree with white or greenish-white, curved, tubular flowers

- kauila (*Colubrina oppositifolia*) - a tree in the buckthorn family (Rhamnaceae) bearing clusters of greenish-yellow or white flowers

- haha (*Cyanea copelandii* ssp. *copelandii*) - a shrub in the bellflower family that produces clusters of yellowish flowers covered by dark red hairs

- haha (*Cyanea hamatiflora* ssp. *carlsonii*) - a palm-like tree with clusters of tube-shaped magenta flowers

- haha (*Cyanea shipmanii*) - an unbranched or sparsely branched shrub bearing greenish-white flowers and armed with small, sharp projections

- haha (*Cyanea stictophylla*) - a shrub or tree with narrowly lobed, toothed leaves and clusters of greenish-white or purplish flowers

- ha'iwale (*Cyrtandra giffardii*) - a shrubby tree in the African violet family (Gesneriaceae) producing small clusters of white flowers with brown hairs

- ha'iwale (*Cyrtandra tintinnabula*) - a similar shrub with larger leaves and white flowers densely covered by long, soft hairs

- *Hesperocnide sandwicensis* - an annual herb in the nettle family (Urticaceae) with a dense covering of coarse, stinging hairs

- Hilo ischaemum (*Ischaemum byrrone*) - a perennial in the grass family (Poaceae) with creeping or tall, erect stems

- wahine noho kula (*Isodendron pyrifolium*) - a shrub in the violet family (Violaceae) producing solitary, fragrant, greenish-yellow flowers

- *Mariscus fauriei* - a perennial in the sedge family (Cyperaceae) with somewhat enlarged underground stems and three-angled aerial stems

- 'aiea (*Nothocestrum breviflorum*) - a stout tree in the nightshade family (Solanaceae) with thick, toothless leaves and clusters of greenish-yellow flowers

- holei (*Ochrosia kilaeensis*) - a tree in the dogbane family that produces a

milky sap and bears clusters of small, greenish-white, trumpet-shaped flowers

- laukahi kuahiwi (*Plantago hawaiiensis*) - a perennial herb in the plantain family (Plantaginaceae) that grows from a stout, short stem and has thick, leathery leaves

- po'e (*Portulaca sclerocarpa*) - a perennial herb in the purslane family (Portulacaceae) rising from a fleshy, tuberous root and bearing clusters of tiny white and/or pink flowers

- loulou (*Pritchardia affinis*) - a fan-leaved tree in the palm family (Arecaceae) that can reach about 82 feet (25 meters) in height

- *Silene hawaiiensis* - a sprawling shrub in the pink family (Caryophyllaceae) covered with short, often sticky hairs and producing flowers that are greenish-white above and maroon below

- *Tetanolopium arenarium* - a shrub in the aster family (Asteraceae) that bears complex, bell-shaped flowering heads containing up to 34 bracts, 45 white, male ray florets, and 9 bisexual disk florets with maroon petals

- a'e (*Zanthoxylum hawaiiense*) - a tree in the rue family (Rutaceae) with leathery, lemon-scented leaves

In a separate December 17 notice, the FWS proposed to list a species of palm endemic to the privately owned island of Ni'ihau, which is managed as a cattle and sheep ranch:

- wahane (*Pritchardia aylmer-robinsonii*) - a fan-leaved tree named in honor of Aylmer F. Robinson, a member of the family that owns the island, who provided much information on the plants of Ni'ihau. Only two trees of this species are known to survive in the wild, although there are some in cultivation.

On December 14, the FWS proposed to list three plant species that occur only in the Wai'anae Mountains on the island of O'ahu:

- haha (*Cyanea grimesiana* ssp. *obatae*) - a usually unbranched shrub in the bellflower family with long, deeply

(continued on next page)

drawing by Yvonne Wilson-Ramsey, reprinted from *Manual of the Flowering Plants of Hawaii*, courtesy of the University of Hawaii Press



Clermontia peleana

Listing Proposals

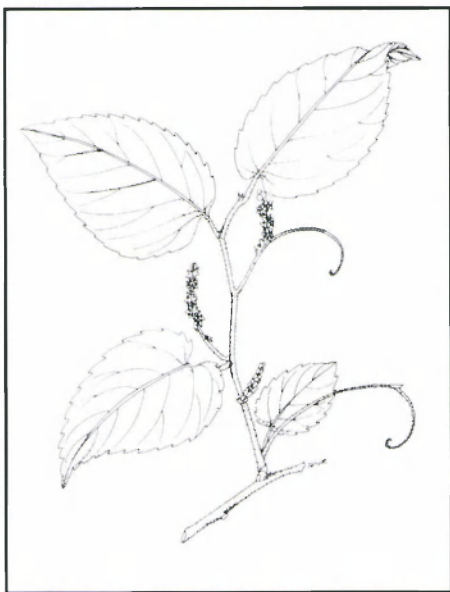
(continued from previous page)

lobed leaves and clusters of purplish or greenish to yellow-white flowers

- *Diellia unisora* - a fern in the family Polypodiaceae producing fronds up to about 12 inches (30 centimeters) in length, with up to 35 pinnae (leaflets) per side

- *Gouania vitifolia* - a climbing shrub or woody vine in the buckthorn family with small white flowers

drawing by Yvonne Wilson-Ramsay, reprinted from Manual of the Flowering Plants of Hawaii, courtesy of the University of Hawaii Press



Gouania vitifolia

All 26 of these Hawaiian plants have been severely reduced in range and population size due to widespread habitat modification and the effects of exotic animals and plants. Specific causes included one or more of the following: competition from introduced plants; habitat degradation by wild, feral, or domestic animals (deer, cattle, goats, pigs, and sheep); agricultural, military, and recreational activities; human-caused fires; and predation by non-native animals (rats, insects, goats, cattle). Some of these factors continue to threaten the remaining plants.

Twelve California Plants

Twelve plants restricted to serpentine soil outcrops in the San Francisco Bay region were proposed December 14 for listing as Endangered or Threatened.

The classification of Endangered was recommended for the following 10:

- **Pennell's bird's beak** (*Cordylanthus tenuis* ssp. *capillaris*) - an herbaceous annual in the snapdragon family (Scrophulariaceae) bearing three-lobed floral bracts and tubular, garnet-brown flowers

- **Tiburon paintbrush** (*Castilleja neglecta*) - a semi-woody perennial in the snapdragon family producing yellowish, sometimes red-tipped floral bracts and small yellow to red flowers

- **Tiburon jewelflower** (*Streptanthus niger*) - an annual herb in the mustard family (Brassicaceae). Its flowers have dark purple sepals, and the petals include a purple claw, white blade, and purple midvein

- **Presidio clarkia** (*Clarkia franciscana*) - a slender, herbaceous annual in the evening-primrose family (Onagraceae) bearing lavender-pink flowers with reddish-purple basal spots

- **fountain thistle** (*Cirsium fontinale* var. *fontinale*) - an herbaceous perennial in the aster family (Asteraceae) with several stout, reddish stems and white to pinkish flowers

- **San Mateo woolly sunflower** (*Eriophyllum latilobum*) - a bushy perennial in the aster family that bears clusters of golden flower heads; currently known from only one site

- **white-rayed pentachaeta** (*Pentachaeta bellidiflora*) - a small, sparsely branched annual in the aster family with flower heads containing yellow disk florets and white to purplish ray florets; currently known from only one site

- **coyote ceanothus** (*Ceanothus ferri-sae*) - an erect evergreen shrub in the buckthorn family with long, stiff branches, round leaves, and clusters of small white flowers

- **Santa Clara Valley dudleya** (*Dudleya setchellii*) - a low-growing perennial in the stonecrop family (Crassulaceae) with fleshy leaves and flowering stems that bear pale yellow flowers

- **Metcalf Canyon jewelflower** (*Streptanthus albidus* ssp. *albidus*) - an annual herb in the mustard family with white to yellow to whitish-green sepals and whitish flowers with light purple veins

Because two of the serpentine plants, while vulnerable, are not believed to be in as much danger as the others, they were proposed for listing in the less critical category of Threatened:

- **Tiburon mariposa lily** (*Calochortus tiburonensis*) - a bulbous perennial in the lily family (Liliaceae) with a branched inflorescence bearing small clusters of light yellow-green flowers containing reddish or purplish-brown marks. Although only one population is known, it is on land owned by The Nature Conservancy.

- **Marin dwarf-flax** (*Hesperolinon congestum*) - an herbaceous annual in the flax family (Linaceae) with slender, threadlike stems, narrow leaves, and clusters of rose to whitish flowers

These 12 taxa are endemic to outcrops of serpentine soils, which are shallow, rocky, and highly erodible, with high concentrations of some minerals (magnesium, chromium, nickel) but low concentrations of others (nitrogen, phosphorus, potassium, calcium). Although such unusual characteristics make serpentine soils inhospitable for most plants, some species have adapted to the rigors of life under these conditions. In fact, serpentine outcrops often support a high diversity of rare plants.

Development in the rapidly urbanizing San Francisco Bay region has claimed nearly 20 percent of serpentine habitats in the past 20 years, and has fragmented some of what remains. The pressure to build more houses, roads, and other facilities continues. Increasing numbers of people also place an ever greater strain on undeveloped wildlands through activities like off-road vehicle use, unauthorized garbage dumping, recreational development, and changes in natural fire regimes. Such disturbances also promote the spread of competing non-native grasses and other plants.

Two Southeastern Fishes

Two species of fishes native to small areas of the southeastern U.S. were proposed December 11 for listing as Endangered:

(continued on page 6)



photo by Dick Biggins

relict darter

Listing Proposals

(continued from page 5)

- **relict darter (*Etheostoma chienense*)** -

This small fish is restricted to the Bayou du Chien watershed in extreme western Kentucky. Only one spawning site is known. Adult relict darters are associated with gravel, sand, and leaf litter substrates near fallen tree branches, undercut banks, or overhanging streambank vegetation. Much of the Bayou du Chien system has been channelized, destroying the habitat characteristics needed by this species. The surrounding region also is extensively farmed, and much of the watershed has been deforested, resulting in a fairly high silt load and further degradation of aquatic habitat.

- **bluemask darter (*Etheostoma* sp.)** -

A formal description of the bluemask darter is expected this year, but biologists already recognize the distinctiveness of this fish. One of its distinguishing characteristics is the bright blue color of breeding males. This species is endemic to the Caney Fork River system in central Tennessee, inhabiting areas of slow to moderate current over sand and fine gravel substrate. Once known from five rivers within the Caney Fork system, the bluemask darter apparently has been reduced in range to isolated sections of four rivers. Its loss of habitat has resulted from impoundments, water withdrawals, and a general deterioration of water quality.

No specific Federal projects that might further jeopardize either of these species have been identified. Their restricted ranges, however, make them very vulnerable to toxic chemical spills.

Tidewater Goby (*Eucyclogobius newberryi*)

A small, slender fish native to tidal streams associated with coastal wetlands in California, the tidewater goby also was proposed December 11 for listing as Endangered. It is the only species in its genus. This fish is restricted during all life stages to low-salinity waters in the upper portions of coastal lagoons from the Smith River in Del Norte

County southward to Agua Hedionda in San Diego County.

The tidewater goby has rather specific habitat needs and can tolerate only a narrow range of salinity. Since 1900, this fish has disappeared from nearly 50 percent of the coastal lagoons within its historic range, including about 75 percent of the lagoons south of Morro Bay. The extensive decline had a multitude of causes: draining of coastal marshes for development, dredging of waterways for navigation and harbors, stream channelization, upstream water diversions, groundwater overpumping, siltation and other impacts from livestock and feral pigs, agricultural runoff, sewage discharges, and possibly predation by non-native fishes. Even when habitat was not destroyed directly, water quality and salinity were often altered beyond the goby's ability to tolerate. Many of these factors continue to threaten the species' remaining habitat.

Under section 10 of the River and Harbors Act and section 404 of the Clean Water Act, the U.S. Army Corps of Engineers is responsible for regulating the placement of fill material into wetlands, including coastal lagoons. Listing the tidewater goby under the Endangered Species Act would ensure that the habitat of this unique fish receives greater consideration as the Corps evaluates permit applications.



photo by B. "Moose" Peterson/WRP

tidewater goby

1992 CITES Amendments Strengthen Protection for Wildlife and Plants

by Susan S. Lieberman

Part 2 of 2

(Editor's note: In the last *Bulletin* (Vol. XVII, No. 12), Susan Lieberman summarized the resolutions passed at the Eighth Conference of Parties (COP8) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), held in 1992 at Kyoto, Japan. In this second half of the article, she discusses other issues such as the sea turtle trade, humane transport, and changes in the CITES appendices.

At COP8, one important issue placed on the agenda by the United States was the detrimental international trade in sea turtles. On March 20, 1991, under the Pelly Amendment to the Fishermen's Protective Act of 1967, the U.S. Departments of Interior and Commerce certified Japan for diminishing the effectiveness of CITES by continued trade in endangered sea turtles (see *Bulletin* Vol. XVI, Nos. 7-8). A Pelly Amendment certification authorizes the President to prohibit importation into the U.S. of wildlife products originating from an offending country.

In response to the certification, Japan announced June 19, 1991, that it would sharply limit hawksbill sea turtle (*Eretmochelys imbricata*) imports between then and December 1992, at which time it would cease all sea turtle imports. Although this ban is now in effect, Japan has delayed withdrawing its CITES reservation on hawksbill trade restrictions until 1994; therefore, its Pelly certification remains in effect. At COP8, Mexico described its sea turtle protection efforts, noting that they had been undermined by the imports into Japan. Several governments and observers endorsed Mexico's remarks, and urged Japan to withdraw its reservation on the species, but the Japanese position was that it "needs time to reorganize the hawksbill shell industry."

Another major issue at COP8 was the humane transport of live wild animals. CITES requires that "any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health, or cruel treatment." Humane transport remains a significant concern of the U.S. and has been an issue at every COP. The U.S. has been very actively involved with the CITES Transport Working Group (TWG), and I was chosen to serve as the TWG Chair until the next COP. The TWG focus is on improving the implementation of CITES and relevant resolutions, training, improvement of international wildlife transport standards, coordination with the International Air Transport Association (IATA) Live Animals Board, and the transport of live wild birds. The first meeting of the TWG since COP8 was held April 29-30, 1993, in Dakar, Sénégal. It was the first time a meeting focusing specifically on the transport of live CITES wildlife was held in Africa. Sénégal is one of the world's largest suppliers of birds for the pet trade.

Changes in CITES Appendices

CITES regulates international trade in plants and animals to varying degrees — depending on the biological status and vulnerability of individual species, genera,

or families to commercial exploitation — by placing them on one of three CITES appendices. Commercial trade in Appendix I species (those threatened with extinction) is prohibited, trade in Appendix II species is regulated by CITES export permits, and trade in Appendix III species is controlled by permits or certificates from the country of origin. The Parties at COP8 considered more than 150 proposals to amend the CITES appendices, most of which passed and became effective June 11, 1992. A list of species transferred onto, within, or off Appendices I, II, or III is available from the Office of Management Authority, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, Rm. 420, Arlington, VA 22203.

Many species were removed from the Appendices as part of the CITES 10-year review process, whereby species that are in no way affected by trade are removed from the Appendices or transferred to a less restrictive Appendix if their biological status warrants such a change. (See table.)

Some amendments of particular interest in the U.S. include:

- **Bears:** After much debate, the CITES Parties added the American black bear (*Ursus americanus*) to Appendix II. This action, based on so-called "look

(continued on page 8)

The following numbers of taxa were afforded increased protection at COP8:

	Moved to Appendix I	Moved to Appendix II
Mammals	4 species	3 species
Birds	5 species	8 species and 6 genera
Reptiles	1 species	4 species
Fish	—	1 species
Invertebrates		1 species
Plants	5 species and 4 genera	11 species
TOTALS	15 species and 4 genera	28 species and 6 genera

1992 CITES Amendments

(continued from page 7)

alike" reasons, was taken to protect endangered Asian bears. There is a growing use of bear gall bladders and other parts in traditional medicines, particularly in eastern Asia, because of alleged curative powers. Parts from endangered Asian bears that are on Appendix I have been traded under the guise of being from the American black bear. With the inclusion of the American black bear, along with bear species in the Baltic States and the former Soviet Republics, all bears (Ursidae) are now listed on either Appendix I or II of CITES. It is hoped this will enable improved tracking of the trade in bear parts and help protect those bears on Appendix I. For the American black bear, any commercial exports of bear gall bladders, paws, or other parts now require an Appendix II permit from the U.S. Office of Management Authority. Individual hunters may take their legally acquired sport-hunted trophies with them out of the U.S. under the personal effects exemption in 50 CFR Part 23.

• **Psittacine birds:** The U.S. submitted proposals at COP8 to transfer three psittacine bird species from Appendix II to I: the blue-fronted Amazon (*Amazona aestiva*) from Argentina, the blue-streaked lory (*Eos reticulata*) from Indonesia, and Goffin's cockatoo (*Cacatua goffini*), also from Indonesia. Just prior to COP8, the government of Argentina imposed a minimum 2-year moratorium on exports of blue-fronted Amazons to conduct studies of the species, including field work on population biology, and to determine what levels of trade would be sustainable. In response to this positive commitment from Argentina, the only country exporting the species, the U.S. withdrew its proposal. Indonesia made a commitment to do the same for the blue-streaked lory, and the U.S. withdrew that proposal as well. The Fish and Wildlife Service is funding two field studies of *Amazona aestiva* in Argentina, and a project in Indonesia on a number of psittacines, as part of our commitment to the CITES "significant trade" project. (See "Landmark Legislation Will Conserve

Exotic Wild Birds" in *Bulletin* Vol. XVII, No. 12.) Because Goffin's cockatoo is an insular species with a very restricted range, whose population has been decimated by unregulated trade and a lack of proper CITES implementation, the Parties adopted its transfer to Appendix I. These actions, taken in no small part because of high volume exports to the U.S., were part of the Service's effort to control the bird trade that culminated in a strong law, the Wild Bird Conservation Act of 1992 (see *Bulletin* Vol. XVII, No. 12).

• **Paddlefish:** The U.S. originally proposed adding the paddlefish (*Polyodon spathula*) to Appendix I, due to its extirpation from the majority of its range and the possibility that heavy demand for premium paddlefish roe could affect the remaining populations. This once-abundant species is known from 22 States, primarily in the Mississippi River basin and some Gulf Coast rivers, but in most cases only remnant populations remain. After consultation with the States, and based on the existence of regulated programs in some States for export of roe from fish taken for sport fishing or raised in aquaculture, the Service amended its proposal and recommended listing the paddlefish on Appendix II. The Parties adopted the proposal. Any exports of paddlefish or their roe now require U.S. Office of Management Authority export permits, which may be issued on the basis of several factors, including a finding from the Office of Scientific Authority that the export is not detrimental to the species' survival.

• **Turtles:** Based on U.S. proposals, the wood turtle (*Clemmys insculpta*) has been added to Appendix II and the bog turtle (*Clemmys muhlenbergii*) has been moved from Appendix II to Appendix I. The wood turtle occurs primarily in parts of eastern North America from southern Canada south to Virginia. Over-collecting has contributed to the decline of this species, which is popular in the pet trade. The bog turtle has a fragmented range from New York to Georgia and is already considered endangered by most of these States. Although it is uncertain how extensive the international trade in bog turtles is, this extremely rare species is in danger of extinction due to over-collecting and loss of wetland habitat. The Parties adopted both of the U.S. proposals.

• **Tropical timber:** Proposals were submitted by several countries, including the U.S., to list several species of tropical trees on Appendix I or II. This is an important move for CITES, as it recognizes the need to regulate international trade in some species of tropical hardwoods to prevent the threat of extinction. The tropical timber proposals adopted at COP8 were: Brazilian rosewood (*Dalbergia nigra*) to Appendix I; and African teak (*Pericopsis elata*) and Caribbean mahogany (*Swietenia mahagoni*) to Appendix II. In the case of Brazilian rosewood (as for all Appendix I species), no trade for primarily commercial purposes is allowed, but products made with Brazilian rosewood removed from the wild

(continued on next page)



paddlefish

photo by Galen Buterbaugh



photo by E. LaVerne Smith

Venus fly-trap

1992 CITES Amendments

(continued from previous page)

before June 11, 1992, can be traded with a pre-convention certificate. Thousands of guitars and other musical instruments contain Brazilian rosewood.

- **Other plants:** Several other plant species were moved to Appendix I or II, depending on their status in the wild and the threat posed by trade. Some examples include: the Venus fly-trap (*Dionaea muscipula*) has been added to Appendix II; 7 species of bromeliads in the genus *Tillandsia*, popular as ornamentals, were added to Appendix II; and 36 species of cacti were added to Appendix I (including all those in the genera *Ariocarpus*, *Discocactus*, *Melocactus*, *Uebelmannia* and *Turbinicarpus*). Illegal trade in wild-collected specimens continues to be a problem for many species of cacti; all cacti are listed on either Appendix I or Appendix II.

Proposals Not Adopted

Many proposals were not adopted but generated extensive and often lively debate. Notable examples of such species, whose listing status did not change

but for which the discussion was valuable, include:

- **Bluefin tuna:** Sweden submitted a proposal to list bluefin tuna (*Thunnus thynnus*) in the Western Atlantic on Appendix I and bluefin tuna in the Eastern Atlantic on Appendix II. The Service responded in the March 4, 1992, *Federal Register* that reductions in tuna fishing quotas by the International Commission for the Conservation of Atlantic Tunas (ICCAT) would speed the bluefin's recovery. The Service also noted that ICCAT has pledged to improve its documentation of trade. Accordingly, the U.S. opposed adding the bluefin tuna to the CITES Appendices. After extensive negotiations, Sweden withdrew its proposal.

- **African elephant:** All African elephant (*Loxodonta africana*) populations were placed on Appendix I at the previous CITES meeting in Switzerland in 1989 (COP7; see *Bulletin* Vol. XV, No. 5) due to the threat posed by poaching for the uncontrolled international ivory trade. Botswana, Malawi, Namibia, South Africa, and Zimbabwe submitted proposals at COP8 to transfer their elephant populations back to Appendix II,

based on several criteria established at COP7. Discussion on these proposals was animated and extensive. In the face of overwhelming opposition, the proposals were withdrawn. All African elephant populations remain on Appendix I, but all of the proponent countries have taken reservations on the listing. Under CITES rules, they can trade commercially in elephant parts and products only with other countries having reservations (there are none outside of Africa) or with non-CITES countries.

* * *

COP8 involved more individuals, countries, and non-governmental observers than any previous conferences, and involved deliberations on more resolutions and proposals than ever before. This is a testament to the increasing international attention to biodiversity, conservation, endangered species, and the international wildlife trade.

The U.S. has been chosen to host the ninth meeting of the CITES Conference of the Parties (COP9), which will take place at a yet undecided location in late 1994. As the opening sentence of the CITES treaty states, "...wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the earth which must be protected for this and the generations to come." The Fish and Wildlife Service is committed to bringing the international conservation community together here in the United States to rededicate it to this important goal.

Dr. Lieberman is the CITES Policy Specialist for the Office of Management Authority, U.S. Fish and Wildlife Service, Washington, D.C.

Puerto Rican Parrots

(continued from page 1)

wild and produced 20 eggs, 10 of which hatched. Of the 10 nestlings, 2 were poorly developed and died. All but one of the eight surviving nestlings fledged successfully in 1991. The one unsuccessful fledging occurred at a PVC nest; after falling from the nest twice in premature fledging attempts, the nestling was placed in the FWS aviary at Luquillo. Production of seven fledged parrots in 1991, however, was above the average for fledging prior to the hurricane. From 1987 through 1989, an average of five parrots fledged in the wild each year.

In 1992, 6 pairs of parrots in the wild produced 18 eggs. The 15 eggs that hatched and the 10 nestlings that fledged were records. The average number of wild parrots fledged in 1991 and 1992 was 8.5, about 33 percent more than the average 1975-1989 fledging rate.

Expansion of the parrot's breeding range also occurred after Hurricane Hugo. For the first time in recent record, a nest was found in the lower transitional forest of the Luquillo Mountains. All previously recorded parrot nest sites had been in the palo colorado (*Cyrilla racemiflora*) life zone, a forest of higher elevation². Moreover, also for the first time in recent record, a natural cavity nest was discovered in a large tabonuco tree (*Dacryodes excelsa*). The tabonuco tree was once an abundant, dominant overstory tree of lower Cordillera and moist limestone forests of northern Puerto Rico.

Possible Benefits of Habitat Disturbance

Why did these increases occur during the past two nesting seasons? A decline in parrot reproduction would be expected in years following a major hurricane. Such storms, however, may have positive long-range effects on the rain forest. The forests of the Caribbean have evolved with hurricanes, and their habitat characteristics have been shaped in part by the disturbances resulting from violent storms every 25 to 50 years.

In the Luquillo Mountains, most of the rain forests where the Puerto Rican parrot currently nests and forages have been rela-

tively undisturbed for 50 years. But this mountainous habitat may not be best for the parrots. Soil fertility is low on the steep mountain slopes, and the area is probably too wet for good parrot nesting. The rich coastal plain forests, destroyed by agriculture earlier this century, may have been better nesting habitat.

Older, undisturbed forests, such as those that provide the last refuge for the Puerto Rican parrot, are not highly productive. Ecologically, these forests are approaching a maintenance stage—less energy is put into reproduction and growth than is put into maintenance of the plants. Consequently, fruit, seeds, and buds, which are necessary food resources for the parrots, may not be abundant throughout the year. When forests are disturbed by storms, however, more energy flows into reproduction and growth. Hurricane Hugo may have stimulated such activity in the parrot's current forest habitat. Thus, increases in clutch sizes and numbers of nests may result from the parrots' feeding on new growth that is high in the nutrients necessary for breeding—new growth stimulated by the hurricane's disturbance. Another possible reason for the increase in parrot productivity is that the hurricane forced parrots to disperse into the lowlands in search of food, which ultimately may have led them to discover new nesting sites.

Important Management Efforts

Because of its seriously reduced numbers and range, intensive management of the Puerto Rican parrot is necessary to prevent its extinction. Since 1968, biologists have worked cooperatively to solve problems at nesting sites. Predation on nestlings or adult parrots by rats, raptors, and snakes; nest parasitism by pearly-eyed thrashers (*Margarops fuscatus*); and parasitism of parrot nestlings by warble flies and soldier flies have been monitored and reduced. In cooperation with the National Audubon Society, the FWS initiated a nest guarding program to monitor breeding pair behavior, chick development, and nest cavity conditions. (See *Bulletin* Vol. XII, No. 7.) The program also fostered and transferred chicks as a means of increasing productivity. In addition, FS personnel, in cooperation with

FWS biologists, expanded their management efforts by creating nesting cavities at locations adjacent to traditional nesting areas. Although these measures increased productivity, recovery has still been slow. Before Hurricane Hugo, the wild population was increasing by only slightly more than two birds per year.

Captive Propagation

Another tool in the parrot's recovery has been the establishment of a captive breeding flock at the FWS Luquillo Aviary in the rain forest. The captive flock suffered no losses during the hurricane. Although facilities were severely damaged, production the year following the hurricane was normal; 37 eggs were produced and 5 young fledged. In 1992, 38 eggs were produced and 2 hatched. One of the 1992 hatchlings was taken from the aviary and successfully fledged in the wild, the first such event since the mid-1980's. Unfortunately, the other 1992 hatchling died.

* * *

Management and research will continue to improve the situation for the Puerto Rican parrot. However, on densely populated islands such as Puerto Rico, the key to the survival of an endangered species may be in its ability to adapt to human-dominated habitats (e.g., suburban habitat or second-growth forests). Restoration of other birds, such as the peregrine falcon (*Falco peregrinus*), has been successful in habitats modified by people. Indications are that this may also be the case for parrots.

J.M. Meyers and W.C. Barrow, Jr., are with the FWS Patuxent Wildlife Research Center, Puerto Rico Research Group, P.O. Box N, Palmer, PR 00721. F.J. Vilella is with the FWS Puerto Rican Parrot Field Office, P.O. Box 488, Palmer, PR 00721.

¹ Rodríguez-Vidal, J.A. 1959. Puerto Rican parrot study. Monograph. Department of Agriculture, Commonwealth of Puerto Rico. No. 1.

² Snyder, N.F.R., Wiley, J.W., and Kepler, C.B. 1987. The parrots of Luquillo: Natural history and conservation of the Puerto Rican parrot. Western Foundation of Vertebrate Zoology. Los Angeles, California. 384 pp.

Regional News

(continued from page 2)

On January 14, 6 captive-bred birds from the FWS Patuxent Wildlife Research Center in Laurel, Maryland, joined the first 6 in the holding facility. They were followed by two more from the ICF the next day. The eight males and six females socialized quickly as a compatible flock. Released to the wild on February 10, they soon began flying to and from the pen and gradually expanding their use area. Some birds roosted at night in a neighboring wetland.

A radio-telemetry device led biologists to the first dead crane on February 17. The three other birds were found between February 18 and 23. Because some mortality is still expected, the remaining members of the flock—6 males and 4 females—will be radio-tracked for about 2 years. If they adjust well to their new environment, more cranes will be released annually to help ensure the survival of the species by maintaining the group as a separate entity from the 136 birds that migrate between Aransas National Wildlife Refuge on the Texas coast and Wood Buffalo National Park in northern Canada—the world's only self-sustaining, wild population of whooping cranes. The Florida release was part of a joint recovery effort among FWS Regions 2, 4, and 8; the Florida Game and Freshwater Fish Commission; and the Canadian Wildlife Service.

In September 1992, Region 2 completed recovery plans for the golden-cheeked warbler (*Dendroica chrysoparia*), Hinckley's oak (*Quercus hinckleyi*), large-fruited sand-verbena (*Abronia macrocarpa*), Pecos bluntnose shiner (*Notropis simus pecosensis*), and Sonora chub (*Gila ditaenia*):

A migratory species, the golden-cheeked warbler faces danger throughout its range, from the United States to Central America. The continuing loss of nesting habitat in central Texas is a major threat to the survival of this bird. Recovery will be achieved when the following criteria have been met for 10 consecutive years: enough breeding habitat has been protected to ensure the survival of at least

one viable, self-sustaining population in each of eight areas outlined in the recovery plan, there is potential for gene flow among demographically self-sustaining populations, enough sustainable habitat exists away from nesting grounds to support breeding populations, and all golden-cheeked warbler populations on public lands are protected and managed.

Recovery efforts will require researching the golden-cheeked warbler's ecology and assessing threats to its breeding, wintering, and migratory habitats. Sharing information and providing technical assistance to land owners and managers is essential if scarce habitat is to be preserved and enhanced. These actions complement ongoing initiatives, such as the 1992 establishment of the Balcones Canyonlands National Wildlife Refuge in central Texas and efforts to develop a Balcones Canyonlands Conservation Plan in the Austin, Texas, area. (See *Bulletin*, Vol. XVI, No. 1 and No. 3, and Vol. XV, No. 1.)

Hinckley's oak is a rare evergreen tree endemic to west Texas, where it grows on dry limestone slopes in the Chihuahuan desert. The decline of the species coincides with changing climatic conditions during the past 10,000 years. Its current distribution is believed to be fragmented among 10 locations, most of which are less than 5 acres (2 ha) in size and contain fewer than 100 trees. Low population numbers, wildlife and insect predation, disease, possible hybridization with other oak species, apparent poor regeneration from seed, and human impacts (such as collecting and road-widening) appear to be the major threats to Hinckley's oak in the wild.

Recommended recovery tasks include protecting existing populations, establishing a reserve seed bank, propagating trees in cultivation, conducting studies to establish management needs, searching for populations not yet discovered, and developing plans for reintroduction. (See *Bulletin*, Vol. XII, No. 10 and Vol. XIII, Nos. 9-10.) Projections are that establishing a minimum of 20 populations totalling 10,000 or more trees will be needed in at least 4 distinct geographical

areas in southwestern Texas. Delisting criteria will be refined as more information is assembled.

* * *

The large-fruited sand-verbena is known to occur at only 3 sites in east-central Texas, where fewer than 3,000 individuals are known to survive. This plant grows in deep sandy soils within openings and disturbed areas of post oak woodlands. Housing development, habitat modification from small-scale clearing, fire suppression, the introduction of non-native plants, and recreational activities (such as horseback riding and off-road vehicle driving) threaten the species' survival.

The large-fruited sand-verbena will be considered recovered when at least 20 demographically stable, genetically viable populations—each comprised of at least 600 plants and covering at least 25 acres (10 ha)—have flourished for 10 years or more. Actions required to achieve recovery objectives for the verbena are similar to those needed for Hinckley's oak. (See *Bulletin*, Vol. XI, No. 6; Vol. XII, No. 7; and Vol. XIII, No. 9.)

* * *

The Pecos bluntnose shiner occurs only in permanently flowing waters of the Pecos River. Historically, this fish occurred throughout the Pecos River system in New Mexico and Texas, but it has decreased drastically in abundance and range, and is now restricted to two short segments of the Pecos River in New Mexico. Loss of permanent stream flows and habitat degradation of river reaches that have permanent flows are the primary threats to this fish. Predation by, and competition with, non-native introduced fishes are also threats.

Maintaining viable populations of the Pecos bluntnose shiner throughout the 100-mile (160-kilometer) reach of the Pecos River where the fish still occurs is essential to recovery. Impoundments and dam operations at several locations in the Pecos River contribute to this species' decline. Recognizing a need to improve the riverine habitat, the Carlsbad Irrigation District, New Mexico Department of

(continued on page 12)

Regional News

(continued from page 11)

Game and Fish, U.S. Bureau of Reclamation, and FWS have agreed to cooperatively study and manage Pecos River resources. A 5-year management plan is now in place to guide the effort. Study objectives are to identify the dynamics and interrelationships of the fish community, riverine habitat, flows, and reservoir operations.

* * *

The Sonora chub is endemic to streams of the Rio de la Concepción drainage of Sonora in Mexico and Arizona in the U.S. This fish inhabits intermittent streams where it occurs in pools near cliffs, boulders, or other cover in the stream channel. Because of its severely limited habitat, the Sonora chub is vulnerable to all activities that threaten the stream or watershed. Impoundments and exploited watersheds threaten this species, along with the introduction of non-native fishes and the pathogens and parasites they may carry.

The recovery plan calls for protecting the Sonora chub in all areas, monitoring occupied habitats, removing non-native fish, and preventing degradation of the remaining habitats. Cooperation by Federal, State, and private interests in the U.S. and Mexico will be required if this species is to survive in the wild.

* * *

In cooperation with the Texas Water Commission, Texas Parks and Wildlife Department, and Utah State University, the FWS has initiated the "Habitat and Flow Requirements Study for the Comal Springs Ecosystem" as part of recovery implementation for listed species of the San Marcos and Comal Springs River systems in central Texas. From November 30 through December 11, 1992, the first round of biological analyses took place, marking the beginning of detailed field work that will continue through each of the four seasons. The purpose of the study is to identify optimum flow levels to maintain the ecosystem, which supports such protected species as Texas wild rice (*Zizania texana*) and the fountain

darter (*Etheostoma fonticola*), along with species of concern, including the Barton Springs salamander (*Eurycea* sp.).

* * *

Region 3 — In Michigan, progress continues toward recovering the Sturgeon River population of the lake sturgeon (*Acipenser fulvescens*), a category 2 listing candidate, and restoring its spawning habitat below the Prickett hydroelectric facility. Gains to date have resulted from cooperation by the Upper Peninsula Power Company in converting to a run-of-the-river flow regime consistent with recommendations by the Michigan Department of Natural Resources; Keweenaw Bay Indian Community; U.S. Forest Service; FWS Ecological Services Field Office in East Lansing, Michigan; and other interested parties.

Michigan Technological University has carefully monitored recovery progress over the past 6 years, noting an increase in the number of adult lake sturgeon, higher numbers of egg-bearing females, a reduction in the duration of spawning (reducing vulnerability to predators and stranding), and increased returns of large spawners. Egg and juvenile survival may also have improved. The improved viability of this unique lake sturgeon population should aid our understanding of important early life history and juvenile habitat requirements, which are now largely unknown. Additionally, the information can be used in formulating Federal and State regulations to conserve lake sturgeon habitat.

* * *

Staff from the FWS East Lansing Field Office also attended a meeting with The Nature Conservancy, Huron-Manistee National Forest, and Michigan State University researchers to discuss plans for 1993 field research on the Endangered Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*). Research will continue on the Huron-Manistee National Forest to identify the butterfly's habitat needs and determine appropriate management. The East Lansing Office also plans work on three forest management areas in 1993 in cooperation with The Nature Conservancy, and will conduct

research at the Allegan State Game Area on habitat delineation and effects of *Bacillus thuringiensis*, a bacterium used to control the gypsy moth.

* * *

Along with the Indiana Department of Natural Resources' Divisions of Law Enforcement and Oil and Gas, Scott Sobiech and Dan Sparks of the FWS Bloomington, Indiana, Field Office recently took part in an investigation of waste sludge pits associated with small oil drilling operations in southwestern Indiana. Although Indiana is not a major oil producing State, small operators have been extracting oil, largely unregulated, for over 40 years. The investigators expected to find birds in the pits but were not prepared for what they discovered — 80 carcasses of bats and birds in only 5 pits. The carcasses have been sent to the FWS National Forensics Laboratory for identification.

FWS personnel will continue to investigate oil pits this spring to gather enough documentation to require fencing and netting at all surface impoundments associated with oil well production, including temporary brine storage lagoons allowed under the Environmental Protection Agency's Underground Injection Control Program. Because at least two Endangered species, the Indiana bat (*Myotis sodalis*) and the gray bat (*Myotis grisescens*), are present in the region, Endangered Species Act violations may be occurring at these surface impoundments.

* * *

Region 4 - In Mississippi, biologists from the State's Natural Science Museum have discovered a population of the Endangered fat pocketbook mussel (*Potamilus capax*) in a side channel of the Mississippi River, more than 400 miles (640 km) downstream from the nearest known population in the St. Francis River in Arkansas. The FWS Jackson Field Office confirmed three dead shells as fat pocketbook specimens.

The Mississippi River soft substrate where the fat pocketbook mussels were discovered is abundant in the St. Francis

(continued on next page)

Regional News

(continued from previous page)

River, where they are the dominant mussel species. During the low water periods of 1993, FWS biologists will sample the Mississippi River for additional populations.

* * *

In conducting a 55-site survey of the Ouachita Mountain area in Oklahoma and Arkansas, the Arkansas Natural Heritage Commission discovered the Endangered harperella (*Ptilimnium nodosum*), a plant in the parsley family, in two additional Arkansas counties, extending its range to Montgomery and Polk Counties from the locations known in 1990 in Scott and Yell Counties.

Harperella is typically associated with mountain streams, where it occurs singly or in large clumps directly in the channel or in adjacent overflow channels and pools. In the Ouachita Mountains, researchers found harperella at 10 sites in 5 separate watercourses. Population sizes ranged from several hundred to more than 5,000 plants. All appeared to be stable, and no immediate or direct threats were identified.

With the exception of one population in the Fouché LaFave River basin, all populations were found in the Ouachita River watershed. Most of the plants in this area are afforded a measure of protection by their location on the Ouachita National Forest. However, any bridge construction or stream channel work near these plants should include protective measures.

Additional field searches are needed in Arkansas and Oklahoma to fully define the range of the species. Harperella also occurs in Alabama, Georgia, South Carolina, North Carolina, West Virginia, and Maryland.

* * *

Survey efforts in Louisiana by the Natural Heritage Program yielded only one confirmed population of *Oenothera pilosella* ssp. *sessilis*, a candidate plant. Historically, this species of evening-primrose was known from prairie remnants in Texas, Arkansas, and Louisiana, many of

which have been converted to agricultural use. The subspecies appears to be rare. It has not been found in Texas since the late 1800's. Only about 6 populations are reported from Arkansas and, despite an extensive survey by the Heritage Program, only one population was determined to be the subspecies *sessilis*.

Specimens collected during the Heritage Program survey often displayed overlapping morphological characteristics between two subspecies, ssp. *pilosella* and ssp. *sessilis*. Similar observations also have been reported for several Arkansas specimens. The taxonomic status of the *sessilis* subspecies as a distinct entity needs to be investigated before its eligibility for listing is assessed further.

* * *

Predation on nestlings and first-year birds appears to be the most immediate threat to the recovery of the Endangered Mississippi sandhill crane (*Grus canadensis pulla*), according to participants at a population and habitat viability analysis workshop held in Pascagoula, Mississippi, last fall. The workshop, which combined the knowledge and experience of 18 biologists involved in crane management and research, examined problems thwarting recovery and recommended management options.

Using computer models, biologists calculated population levels needed for the long-term viability of the species and determined whether additional habitat for feeding and nesting is necessary. Four working groups studied questions of habitat quantity and quality, life history parameters, health and disease, and captive propagation by analyzing current data from wild and captive crane flocks.

The workshop was cosponsored by the FWS Jackson Field Office and the Mississippi Sandhill Crane National Wildlife Refuge, in conjunction with Dr. Ulysses Seal of the IUCN Captive Breeding Specialist Group. Dr. Seal is known internationally for his expertise in small population biology. He has conducted workshops on population and habitat viability analysis for dozens of wildlife species worldwide, from butterflies to birds, reptiles to amphibians, and lemurs to rhinos.

* * *

Region 5 - A one-day seminar on the Endangered Species Act has helped the New England Field Office (NEFO) enhance its coordination with the Region 1 Office of the Environmental Protection Agency (EPA) regarding program responsibilities. In early December, FWS Region 5 and NEFO staff conducted section 7 training for about 60 EPA staff, including representatives from all branches. Since then, EPA permit and project leaders have consulted informally on a variety of National Pollution Discharge Elimination System permits and Superfund site assessments.

An important informal consultation is taking place regarding EPA's authority to regulate dioxin discharges from Kraft process (a chlorine and chlorine derivative bleaching process) pulp and paper mills in northern New England. Bald eagles (*Haliaeetus leucocephalus*) nest or winter along most of the affected waters. Two of the rivers, the Androscoggin in New Hampshire and Penobscot in Maine, also have human health advisories because of unacceptably high levels of dioxin in fish tissues.

The NEFO is evaluating whether further discharges of dioxin into these waters may adversely affect the bald eagle. In the northwest, the FWS Region 1 Office is also conducting a formal consultation with EPA's Region 10 Office regarding dioxin and bald eagles in the Columbia River. The NEFO is coordinating closely with the FWS Portland, Oregon, Field Office on this potentially controversial issue.

* * *

The NEFO is continuing efforts to protect wintering bald eagle habitat along the Merrimack River in New Hampshire. Three large highway projects—the Nashua-Hudson Circumferential, I-293 Widening, and South Manchester Airport Access—threaten this riparian corridor. As a result of FWS involvement, the Army Corps of Engineers is preparing a biological assessment for the Nashua-Hudson project, and the Federal Highway Administration has funded a wintering eagle habitat utilization study for the other two projects.

(continued on page 14)

Regional News

(continued from page 13)

* * *

Estimated numbers of Endangered roseate terns (*Sterna dougallii dougallii*) nesting in the Northeast were not at all "rosy" in 1992, slipping some 20 percent to 2,898 pairs from 3,603 pairs in 1991. These numbers, the lowest in 15 years, were mirrored throughout the region, with Great Gull Island, New York, reporting a drop to 1,050 pairs from 1,300 in 1991, and Massachusetts numbers declining to 1,412 pairs from 1,776 the year before. Despite an intensive search, Maine colonies were down 4 percent to 122 pairs from 127.

Researchers do not know whether reduced counts at breeding colonies reflect an actual drop in the roseate tern population or merely a reduction in the number of pairs that nested in 1992. As in recent years, more than 85 percent of the entire northeastern roseate tern breeding population occurs on just three islands, Bird Island (Massachusetts), Faulkner Island (Connecticut), and Great Gull Island (New York). (See *Bulletin*, Vol. XVI, Nos. 9-12; Vol. XII, Nos. 11-12; and Vol. XI, No. 12.)

* * *

On a more encouraging note, for the first time in 20 years, nesting common terns (*Sterna hirundo*) and least terns (*Sterna antillarum*) returned to Ram Island in Buzzards Bay, Massachusetts, responding to an effort by the FWS and the Massachusetts Division of Fish and Wildlife to reclaim the area for terns. Gull management, under way since 1990, will continue on the island, with the goal of fully restoring this historically important colony for common terns and roseate terns.

* * *

The final revised recovery plan for the small whorled pogonia (*Isotria medeoloides*) is available. This rare orchid species is widely distributed, with 86 known sites in 15 States and Canada, but populations continue to be lost as habitat is degraded, developed, and otherwise threatened. Recovery activity has gener-

ated new information about life history, distribution, and populations, and some level of habitat protection has been achieved for approximately 47 percent of the sites. Contact Susi von Oettingen at NEFO (603/225-1411) for more information. (See *Bulletin*, Vol. XVI, Nos. 7-8; and Vol. XI, No. 12.)

* * *

The FWS Chesapeake Bay Field Office (CBFO) presented a rare insects exhibit that was received enthusiastically at the national meeting of the Entomological Society of America, an event that attracted more than 2,500 registered participants to Baltimore, Maryland, from December 6 to 9, 1992. A key part of the display was a poster entitled "The Endangered Species Act: Protection of Rare Insects." Featuring all federally listed and proposed insect species throughout the U.S., the poster outlines protection and recovery activities. Many entomologists said they had been unfamiliar with FWS insect conservation efforts or had harbored misconceptions about them. They also made significant comments on the compilation of insect listing candidates or indicated they would do so. For more information, contact Judy Jacobs, CBFO, at 410/269-5448.

On February 24, FWS Region 5 and the Entomological Society of America cosponsored a "Candidate Insect Assessment" workshop, in conjunction with the Society's Eastern Branch meeting in Williamsburg, Virginia. The purpose of the workshop, which was attended by professional entomologists as well as FWS and Natural Heritage Program biologists from the Northeast Region and North Carolina, was to assemble information on the more than 60 insects in Region 5 that are candidates for protection under the Endangered Species Act. The workshop was fruitful in prioritizing insect groups most in need of further status survey work.

* * *

Region 6 — The recovery program for the pallid sturgeon (*Scaphirhynchus albus*) is getting into full swing with a variety of research, survey, and captive propagation projects. In the spring of 1992, pallid

sturgeons were hatched for the first time in captivity at Missouri's Blind Pony State Hatchery, a unit of the Missouri Department of Conservation. Survival of fry exceeded expectations, and approximately 20,000 pallid sturgeon fingerlings are being kept at the hatchery. The Blind Pony State Hatchery and the Gavins Point Hatchery in South Dakota are gearing up for additional attempts at spawning the fish. These activities will increase our knowledge of successful spawning techniques and rearing requirements for developing future broodstock. No reintroductions will be proposed for this species until more information is available on the sturgeon's genetics.

Crews from the Louisiana Department of Wildlife and Fisheries captured a juvenile pallid sturgeon in the Mississippi River at its confluence with the Atchafalaya River. This is the youngest pallid sturgeon recorded in several decades and the first documentation that the species is reproducing in the wild. Because of the juvenile's size, it is believed to have spawned close by, and is evidence that some spawning still occurs in Louisiana. The juvenile sturgeon was captured along with 11 adult pallid sturgeons at the same location where 9 were captured by a commercial fisherman in 1991. The good news about the pallid sturgeon is tempered, however, by continuing concern about apparent frequent hybridization between the shovelnose sturgeon and the pallid sturgeon on the Mississippi River.

Genetics studies to guide propagation and reintroduction programs are under way. The Montana Department of Fish, Wildlife and Parks, through contract with the Army Corps of Engineers, is radio tracking pallid sturgeons in the Yellowstone and Missouri Rivers. One tagged fish was tracked over approximately 65 river miles (105 km).

* * *

Interim guidelines have been established to guide surveys for the Ute ladies'-tresses (*Spiranthes diluvialis*). This Threatened orchid occurs in seasonally moist soils and wet meadows near

(continued on next page)

Regional News

(continued from previous page)

springs, lakes, and perennial streams and their associated floodplains below 6,500 feet (1,980 meters) in parts of Utah, Colorado, and Nevada. Because this orchid flowers for only a short time and may not flower every year, conducting effective surveys is difficult. Further, the species is so rare that little is known about its habitat requirements and population ecology. The interim guidelines were de-

veloped to streamline and standardize surveys for proposed projects that may have an impact on wetlands and floodplains where the species could occur.

* * *

Status surveys on two prairie butterfly species, the Dakota skipper (*Hesperia dacotae*) and the powesheik skipper (*Oarisma powesheik*), have been completed. The Dakota skipper inhabits undisturbed or lightly disturbed native tall grass and midgrass prairie; the powesheik skipper inhabits wetland communities,

such as meadows and fens, within native grasslands. These species probably were once widely distributed from Manitoba, Canada, southward to South Dakota and Illinois, but now they occur only in scattered, isolated locations.

The biggest threat to both species is the conversion of native grasslands to other uses. Additional threats are pesticide spraying, grazing, and invasions by exotic plant species. The powesheik skipper is also threatened by alteration of wetlands within native grassland habitats.

Final listing rules for six species were published by the Fish and Wildlife Service in December 1992. Endangered Species Act protection now applies to the following:

Karner Blue Butterfly (*Lycaeides melissa samuelis*)

The Karner blue butterfly once occurred within a rather narrow band extending from eastern Minnesota across portions of Wisconsin, Illinois, Indiana, Michigan, Ohio, Canada (Ontario), Pennsylvania, New York, Massachusetts, and New Hampshire. This small subspecies depends on the occurrence of wild lupine (*Lupinus perennis*), a wildflower in the pea family that is the only known food plant for the butterfly's larval stage. Over the past 100 years, silviculture, ur-

banization, and suppression of the wildfires needed to maintain the butterfly's open habitat have eliminated the Karner blue from about 99 percent of its historical range. On December 14, 1992, the Service listed the Karner blue butterfly as Endangered.

Five Idaho Snails

Five species of aquatic snails found in the middle Snake River in south-central Idaho also were given Endangered Species Act protection. The December 14 *Federal Register* notice listed four of these mollusks as Endangered:

- Idaho springsnail (*Pyrgulopsis idahoensis*)
- Snake River Physa snail (*Physa natricina*)

- Utah valvata snail (*Valvata utahensis*)
- Banbury Springs limpet (*Lanx* sp.).

One other snail, found to be vulnerable but not in imminent danger of extinction, was listed under the less critical classification of Threatened:

- Bliss Rapids snail — an undescribed species in the family Hydrobiidae.

Although the Banbury Springs limpet is not known to have declined significantly, its limited distribution of only three sites makes this snail vulnerable. The other four taxa now exist in only a small fraction of their historical range. Their clean, cold, free-flowing aquatic habitat has been reduced by hydroelectric development, water withdrawals, drought, and pollution from sewage effluents and agricultural runoff.

Lab Identifies Wolves

(continued from page 3)

and large size is typical of wolves found in southern Manitoba," according to biologist Dan Licht of the FWS Bismarck, North Dakota, Field Office. Again, the lab used DNA testing, supplemented by a variety of skull measurements, for its determination.

Ten wolves have been killed in North Dakota since 1981, including 5 in the past 2 years, and all have been about 2 years old. "That's a typical age for a wolf to leave the pack and attempt to establish

a new territory," said Licht. Biologists believe that residents of the Dakotas may occasionally see a wolf that has left its pack in Manitoba or Minnesota. The gray wolf historically ranged throughout North and South Dakota.

FWS law enforcement officials are investigating the circumstances of the North Dakota shooting. The penalties authorized under the Endangered Species Act for killing a listed animal without a permit are serious — up to a year in jail and/or a \$100,000 fine. Fortunately, most people support the protection of wolves that do not harm livestock. "The

positive response I've witnessed from North Dakotans toward wolves has been amazing," Licht noted.

Anyone seeing a wolf in the western United States is encouraged to contact the nearest State or Federal wildlife agency office.

Natural Areas Conference

This year, the 20th Natural Areas Conference will be held June 22-25 at the University of Maine. Its theme is "Conservation in the Working Landscapes," and it will include invited and contributed papers on the following symposia topics: Conservation in Marine Ecosystems, Conserving Rare and Endangered Species and Natural Communities in Working Landscapes, Biological Diversity in Working Landscapes, and Inventorying and Monitoring Natural Areas in Working Landscapes. A number of field workshops organized around the symposia will be available for participants.

This conference, underwritten in part by the Fish and Wildlife Service, Bureau of Land Management, Forest Service, National Park Service, Environmental Protection Agency, and National Oceanic and Atmospheric Administration, will offer participants the opportunity to explore a multitude of working landscapes in the United States and around the world through the presentation of over 150 papers, workshops, roundtable discussions, and posters. For more information, write Hank Tyler, Conference Coordinator, Maine State Planning Office, Station 38, Augusta, Maine 04333, or call 207/624-6041.

BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	56	249	9	22	336	33
Birds	73	153	16	0	242	72
Reptiles	16	64	18	14	112	25
Amphibians	6	8	5	0	19	9
Fishes	55	11	37	0	103	57
Snails	12	1	7	0	20	8
Clams	50	2	5	0	57	39
Crustaceans	9	0	2	0	11	4
Insects	15	4	9	0	28	14
Arachnids	3	0	0	0	3	0
Plants	299	1	73	2	375	153
TOTAL	594	493	181	38	1306*	414**
Total U.S. Endangered	594	(295 animals, 299 plants)				
Total U.S. Threatened	181	(108 animals, 73 plants)				
Total U.S. Listed	775	(403 animals, 372 plants)				

* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, chimpanzee, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

** There are 334 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of Cooperative Agreements signed with States and Territories: 53 fish & wildlife
39 plants

Number of CITES Party Nations: 117

April 2, 1993

January-February 1993

Vol. XVIII No. 1

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, Fish and Wildlife Service
Washington, D. C. 20240

FIRST CLASS
POSTAGE AND FEES PAID
U.S. DEPARTMENT OF THE INTERIOR
PERMIT NO. G-77

